THE CANADIAN MILLER

Old Series, Vol. XI. } Number 4. TORONTO, ONT., APRIL, 1894 { Terms, $1.00 Per Year
New Series, Vol. IV. } { Single Copies, 10 Cents

BISCUIT FLOUR.

NOTICE has been taken of some flours which occasionally find their way into biscuit-flour lofts flours with glutens of so deteriorated a nature that they are just as unfit for biscuit as for bread making. A rough analysis of such flours reveals at once, says the writer in The British Baker, the weak spot, and this naturally brings up the question as to the merits and advantages of conducting analysis of flours. It has to be admitted that bakers and millers rarely resort to analytical examination of even the rudest nature—not perhaps so much because they are unacquainted with the different methods as because they are doubtful as to the advantages that accrue to them from adopting such processes. To a certain extent they are correct. Flour is of such a complex nature, and made up of so many constituent parts, that a complete analysis is a very delicate and laborious task, and capable of being undertaken only by those who have had a chemical training, which, unfortunately, few bakers have had. The biscuit baker adopts the more convenient and simpler method of getting at the merits and demerits of a certain flour by baking the flour into a particular biscuit. He takes care (at least he ought to) that the other ingredients put in along with the flour are not faulty, and that the dough gets justice at its various stages. If the biscuit turns out right, then the flour will suit him; if it turns out wrong, then he reports unfavorably of it, and looks for something more to his taste. This, of course, is rather a drastic way of proceeding, and often results in injustice to the flour. The biscuit made from a sample sack of flour may exhibit faults such as blisters or bad shape; the biscuits may spring too much, or may not spring at all; they may all crack up as soon as they begin to cool, etc. If any or all these things happen, the foreman rather hastily may assume the new flour to be at fault. A rough examination of the flour would at once corroborate any such assumption, for, unfortunately, flour is often blamed for producing certain effects on biscuits when it is entirely blameless. The blisters on the biscuits may have been caused by a careless machine-man or brakesman in dispensing his dust too freely, and may have had no connection whatever with the quality of the flour. The bad shape of the biscuits may have been the result of the dough being toughened in the mixing stage, and may not have been due at all to the strength of the flour. The want of spring in the biscuits may have been caused by the sodas and acids reacting on each other before the biscuits were fired, and may not have been due to rotten-glutened flour. The increased spring may have been due to several causes unconnected altogether with the strength of the flour. A superficial examination of the flour itself, however, would result in either exculpating or condemning it on the charge of having produced any of the effects mentioned above. The biscuit baker's task in this respect is lighter than that of the bread baker, for to him the question of tenacity, rigidity, viscosity, etc., is not of such paramount importance as it is to the man whose aim is to turn out the requisite number of well-risen loaves. Unless in the case of the cheaper class of biscuits, sold by count, the biscuit baker deprecates anything which tends to cause extra lightness in his biscuits. In the finer class of goods (especially of the pan series) he has to avoid a flour with such a characteristic. Now, as I mentioned before, anything in the shape of a complete analysis of flour is out of the question in practical work, even if the results would repay the trouble of such a minute examination. There is no necessity, for instance, for the biscuit baker to analyze flour so minutely as the following, in order to find out what particular part of the flour has caused his biscuits to be faulty:

CONSTITUENTS OF FLOUR.

	Household.	Best Household.	Best Whites
Starch and Dextrin	69.04	71.05	76.31
Cellulose	.52	.70	.77
Sugar	.71	.64	.68
Albuminoids and other nitrogenous matter insoluble in alcohol	9.36	7.94	9.40
Nitrogen matter soluble in alcohol	6.84	5.05	4.20
Fat	1.26	1.22	1.08
Mineral matter	.67	.73	.58
Water	11.81	12.67	12.96
	100.00	100.00	100.00

In the above analysis it will be noticed that the nitrogenous matter is divided into two portions—that soluble and that insoluble in alcohol. In the former is included gliadin and similar substances, in the latter albumin and fibrin.

For practical purposes the biscuit baker will find it sufficient to ascertain the amount of crude gluten in any particular flour he may wish to examine—*i. e.*, the substance left when flour is kneaded with water, and afterwards washed to remove the starch and the soluble constituents of flour. This crude gluten consists for the most part of three nitrogenous principles—gliadin, mucin and fibrin—together with some of the ash and oily matter. The mode of procedure adopted to eliminate the soluble matter and leave the crude gluten is pretty generally known, but as many readers of this journal may not be aware of the most reliable method of avoiding mistakes, I will take the liberty of giving the necessary details, with all due apologies to those who have them already by heart. A chemical balance is the only apparatus required.

Weigh out about forty grammes of the flour to be examined, and after placing it in a small basin add about thirty cubic centimetres of water and make into a dough, care being taken, of course, to see that none of the flour is lost; let the dough lie for one or two hours; get a piece of fine calico or fine silk, same as is used by millers for dressing flour, and wash the dough on the top of the silk; let a small stream of water fall on the dough while you knead it carefully and thoroughly with the fingers; the water carries off the starch and soluble material from the dough, and they disappear through the silk, while at the same time the silk catches any crude gluten which may by accident become detached from the mass; any which does not become detached must be carefully picked up, and added to the kneaded portion. After this process has been completed, take the lump of gluten and wash it thoroughly in a basin of clean water. The elimination of the starch is best attained here by rubbing vigorously with the hands and fingers; when the water becomes turbid pour it through a new piece of silk, which catches any piece of gluten that may have got separated from the mass; this, of course, is added to the mass. This washing in the basin must be repeated until the absence of turbility in the water shows that all the soluble matter has been washed away. The water clinging to the gluten is then squeezed out, and the weight of the mass remaining gives the amount of wet gluten. Forty grammes of flour will give from nine to twelve grammes wet gluten.

As there is always (more or less) a quantity of water adhering to the gluten, to get accurate results this wet gluten has to be thoroughly dried, which is done by placing it for twenty or thirty hours in a hot-water oven, and allowing it to cool in a desiccator, which is simply a bell jar placed over a glass or marble surface, and containing within it a small quantity of strong sulphuric acid. The drier mass is then weighed, and the result gives the amount of dry gluten present in the flour. The estimation of the quantity of gluten, it will thus be seen, is an operation capable of being performed by every biscuit baker who may possess a chemical balance; and, though it be but a rude analysis, it is quite sufficient, in nine cases out of ten, to give a fair idea of what a particular flour is capable of doing, as far as biscuits are concerned. Such an estimation is distinctly valuable as a corollary to the practical test, for it furnishes the reason for the particular result which the practical test may furnish. Take the case of a new flour being baked into a fine pan biscuit. The biscuit comes out of the oven, and has certain defects; say, for instance, it is oval-shaped, has large holes in the bottom, and springs too much. An estimation of the gluten present in the flour will show that it possesses a high percentage of that constituent, and if the gluten be examined it will be found to be of good quality; it will be tough and elastic to the touch. The amount of gluten found, however, will show that the flour is unsuitable for fine pan biscuits. The question dealing with the percentage of gluten most suitable for this class of biscuit has been already treated in the second article of this series.

Take another case where the biscuit will not spring at all. If this result be the fault of the flour, the gluten test will at once reveal it. The amount of gluten found may be fairly high, but the quality will be found to be bad. Instead of being tough and elastic it will be soft and sticky, and perhaps have a musty odor. There is an instrument called the aleurometer, the object of which is to test the quality of the gluten; but the result obtained from it cannot be depended on, and, in fact, the baker, with a little practice, can find from a close examination of wet gluten whether the quality of it is such as is suitable for whatever biscuit he may be wishing to employ the flour.

In selecting flours suitable for cracker biscuits (where the fermentation process is employed), Jago's viscometer may be used with advantage. This is an instrument for measuring the viscosity of dough, and takes into account the somewhat opposing characteristics of tenacity and rigidity. For full particulars of this ingenious invention the reader is referred to Jago's text-book, where details may be obtained. By making up dough and using it at once in this apparatus, and by letting dough made from the same flour lie for some time and then using it in the apparatus, results may be got which give hints as to the methods best suited for fermentation. You can detect by its aid those flours which fall away in the sponge, and such flours must, of course, be either more quickly fermented or, what is better, used up in the doughing stage.

WHY PULLEYS RUN STEADY.

CENTRIFUGAL force has less to do with making a pulley run unsteady than the mere tendency it has of trying to get where it can rotate about its own center of gravity. A wheel is generally looked upon as so much weight and, if held off its center, must go switching about like a heavy stone in a short arm sling, tending to pull the machinery to pieces. This may be well enough at the start, while the wheel is getting up to speed, but the time soon comes when the wheel will try to turn on its own center and let the shaft sling for a while. Just notice how the juggler can seize a dish of any kind, as a dinner plate, for instance, and throw it up in a whirling motion and, while in the air, catch it on the end of a stick and cause it to rotate with ease. At first the plate is switched about by holding it off to one side of the center, but as the speed increases, it gradually brings the point of support near the center, till at last it is allowed to spin on its own center of gravity. In this case all the driving power, supporting force and the resistance of the load were brought to one single point, with nothing to react upon the inertia of the plate. A wheel has recently been fitted up to revolve in a frame with no other force applied to it than what is derived from the vibrations of the frame itself. The wheel, of course, is out of balance, as far as its center of gravity goes.